

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE: PRESENTS: SHALL COME;

Mest Bred TIG

MACCENS, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT. THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY LARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC EPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE FIT TO EXCLUDE OTHERS FROM SELLING THE VARIETY OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR TING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT BY THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'Vantage'

In Testimonn Microst, I have hereunto set my hand and caused the seal of the Flant Mariety Protection Office to be affixed at the City of Washington, D.C. this twenty-ninth day of April, in the year two thousand and eight.

Edmand T. Schafe

ocretary of Agriculture

Attost:

Benz

Commissioner Plant Variety Protection Office Agricultural Marketing Service

GENERAL INSTRUCTIONS: To be effectively filed with the Plant Variety Protection Office (PVPO), ALL of the following items must be received in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E, F; (3) for a tuber reproduced variety, verification that a viable (in the sense that it will reproduce an entire plant) tissue culture will be deposited and maintained in an approved public repository; and (4) payment by credit card or check drawn on a U.S. bank for \$4,382 (\$518 filing fee and \$3,864 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice). NEW: With the application for a seed reproduced variety or by direct deposit soon after filling, the applicant must provide at least 3,000 viable untreated seeds of the variety per se, and for a hybrid variety at least 3,000 untreated seeds of each line necessary to reproduce the variety. Partial applications will be held in the PVPO for not more than 90 days; then returned to the applicant as un-filed. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initiated and dated. DO NOT use masking materials to make corrections. If a certificate is allowed, you will be requested to send a payment by credit card or check payable to "Treasurer of the United States" in the amount of \$768 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. The fees for filing a change of address; owner's representative; ownership or assignment; or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

Plant Variety Protection Office

Telephone: (301) 504-5518 FAX: (301) 504-5291

General E-mail: PVPOmail@usda.gov

Homepage: http://www.ams.usda.gov/science/pvpo/PVPindex.htm

SPECIFIC INSTRUCTIONS:

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and provide evidence that the permanent name of the application variety (even if it is a parental, inbred line) has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: U.S. Department of Agricultural Marketing Service, Livestock and Seed Programs, Seed Regulatory and Testing Branch, 801 Summit Crossing Place, Suite C, Gastonia, North Carolina 28054-2193 Telephone: (704) 810-8870. http://www.ams.usda.gov/lsg/seed.htm.

ITEM

- 19a. Give:
- (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
 - (2) the details of subsequent stages of selection and multiplication;
 - (3) evidence of uniformity and stability; and
 - (4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 19b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
 - (1) identify these varieties and state all differences objectively;
 - (2) attach replicated statistical data for characters expressed numerically and demonstrate that these are clear differences; and
 - (3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 19c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 19d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 19e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
- 20. If "Yes" is specified (seed of this variety be sold by variety name only, as a class of certified seed), the applicant MAY NOT reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See Regulations and Rules of Practice, Section 97.103).
- 23. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
- 24. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.
- 22. CONTINUED FROM FRONT (Please provide a statement as to the limitation and sequence of generations that may be certified.)
- 23, CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)
- 24. CONTINUED FROM FRONT (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid CMB control number. Valid CMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 1.4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

"Vantage"

Hard Red Spring Wheat

Exhibit A. Origin and Breeding History

Vantage (CA902-704) is a hard red spring wheat derived from the cross "Keystone" x "Granite". The cross was made in the fall of 2000 in a growth chamber and F₁, F₂ and F₃ seed generations were advanced in growth chambers with selection for agronomic (height, stem strength, self-fertility) and seed (hard vitreous) characteristics. The F₃ seed was planted as a bulk in Casselton, ND in the spring of 2001. Individual F₃ plants were evaluated for agronomic characteristics and general disease reactions. These plant selections were advanced to the F₄ in growth chambers and F₄ head rows (F₅ seed) were planted in Yuma, AZ in November 2001. Vantage is derived from a single F₅ plant selection from that nursery. The F₆ seed was planted as a single 5' x 20' plot in Casselton, ND in the spring of 2002, where it was evaluated for maturity, height, straw strength, and resistance to foliar disease, stem rust, leaf rust and Fusarium head blight (scab) and harvested as an F₇ bulk and given the experimental designation CA902-704. It was advanced and evaluated from the F₇ to F₉ as a bulk in Casselton ND in 2003 through 2005. The resulting F₁₀ was increased as Breeder Seed on 2 acres in Brawley, CA in the winter of 2005-2006. About 106 bushels of the resultant F₁₁ Breeder Seed was planted on 53 acres in Casselton, ND in the spring of 2006 as an initial Foundation Seed increase. 3660 bushels of Foundation Seed was harvested in August 2006 and CA902-704 was name Vantage. The Foundation Seed (F₁₂) was planted in the spring of 2007 to produce Registered and Certified class seed. The first unencumbered sales of Vantage will be in the spring of 2008.

Vantage was tested extensively in regional and company trials from 2004 to 2006 (Table 1). Vantage was tested throughout North Dakota, Minnesota, and South Dakota in the USDA Uniform Regional Nursery (Tables 2-8) in 2006. While very similar to the variety Granite in morphology, growth habit, and grain quality, Vantage has a much improved resistance to Fusarium head blight. Vantage is hard red spring wheat bred by WestBred LLC and adapted to North Dakota, Minnesota and South Dakota. Vantage is a semi-dwarf with a medium late maturity profile, high test weight seed, very strong straw strength and very high protein levels. The quality of Vantage is similar to Granite (an acceptable milling wheat) based on the very high protein and moderate SDS Flour Sedimentation values.

Vantage has been observed for six generations of increase and testing and is uniform and stable. Vantage is a semi-dwarf and variants 10-15 cm taller than the variety may appear at a frequency of 0.5% in Foundation Seed production fields and up to 1.0% may be observed in subsequent generations. Vantage will be purified as head rows on a regular basis.

Table 1. Mean agronomic data reported Vantage, Granite, Alsen and Bigg Red for 33 environments in ND, SD and MN.

| Variety | n | Heading -days from 6-1- | Height -cm- | Leaf Rust 1-7 ¹ | Foliar Disease 1-7 ¹ | VSK ¹ -%- | Protein -%- | Sed ² -mm- | TWT -lbs/bu- | Yield -bu/a- | FN ³ -sec |
|----------------|--------|-------------------------------|----------------|---|--|-------------------------|--|---|---------------------------|--|---|
| | 1 | | | | | | | | | | |
| 2004 Fisher, | MN | | | | | | | | | | |
| Vantage | 3 | - | 88.1 | | _ | 0.0 | 13.0 | 99 | 64.2 | 71.8 | 261 |
| Granite | 3 | - | 84.7 | _ | - | 1.4 | 13.4 | 93 | 63.6 | 79.1 | 256 |
| Alsen | 3 | - | 88.9 | - | | 2.2 | 13.3 | 117 | 62.5 | 64.6 | 286 |
| Bigg Red | 3 | - | 99.9 | _ | _ | 0.6 | 12.2 | 103 | 62.3 | 64.1 | 301 |
| 2004 Eldrid, N | MN | | | | | | | unununununununun | aunininininininininininin | rent terr end t belging a benderater greater greater | |
| Vantage | 3 | 47.3 | 75.4 | _ | - | 0.7 | 11.9 | 80 | 63.5 | 38.9 | - |
| Granite | 3 | 47.0 | 75.4 | - | | 0.4 | 12.2 | 80 | 63.4 | 37.1 | - |
| Alsen | 3 | 41.7 | 83.8 | - | | 0.7 | 11.8 | 106 | 62.7 | 37.6 | - |
| Bigg Red | 3 | 45.0 | 86.4 | _ | _ | 0.0 | 10.3 | 75 | 63.2 | 39.4 | - |
| 2004 Thomps | on, N | D | | | | | The state of the s | | | | |
| Vantage | 3 | 43.7 | 85.5 | _ | 3 | 0.5 | 15.5 | 98 | 63.5 | 63.4 | _ |
| Granite | 3 | 43.7 | 84.7 | _ | 2 | 3.3 | 15.4 | 111 | 64.1 | 63.6 | _ |
| Alsen | 3 | 40.7 | 93.1 | | 2 | 1.0 | 15.1 | 119 | 62.4 | 55.9 | _ |
| Bigg Red | 3 | 43.7 | 97.4 | | 2 | 0.0 | 14.3 | 112 | 63.4 | 64.1 | *** |
| 2004 Steele, ħ | ND Fu | naicide | | | | | | ng gaga-jir jagtaja tida tamaa tah | | | |
| Vantage | 4 | 37.0 | _ | _ | - | 3.3 | 15.4 | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | 61.9 | 39.3 | _ |
| Granite | 4 | 37.5 | 88.9 | - | - | 3.16 | 14.9 | | 61.6 | 43.5 | _ |
| Alsen | 4 | 32.5 | 86.4 | _ | - | 0.0 | 15.5 | 1 | 61.3 | 35.7 | - |
| Bigg Red | 4 | 33.0 | 99.1 | - Andread Control of the State | endedendrates (Februaria) (Februaria) (Februaria) | 0.0 | 14.3 | | 63.0 | 31.6 | _ |
| 2004 Steele, N | ID Un | treated | | | | unamimoro in inininina | | | | nasnam, rturi , jiyyiyi aa i jaraan. | *************************************** |
| Vantage | 4 | 32.0 | 76.2 | - | - | 3.70 | 13.2 | | 57.9 | 27.0 | *** |
| Granite | 4 | 37.8 | 78.7 | - | - | 5.38 | 13.6 | | 60.4 | 33.9 | |
| Alsen | 4 | 32.3 | 83.8 | _ | - | 0.95 | 13.0 | 1 | 59.7 | 26.6 | - |
| Bigg Red | 4 | 33.0 | 96.5 | erfeladiferfelle berfelle berfelle | | 0.91 | 11.3 | | 60.8 | 25.4 | - |
| 2004 West Fa | rgo, N | ID Fungicid | е | | | | ementenentenentenentenentenentenentenen | Hoper | | | |
| Vantage | 4 | 29.0 | 81.9 | 2.3 | | 2.81 | 14.0 | 102 | 62.2 | 76.3 | - |
| Granite | 4 | 33.0 | 89.5 | 1.8 | - | 2.55 | 15.8 | 97 | 64.3 | 76.2 | |
| Alsen | 4 | 28.0 | 93.3 | 1.8 | - | 0.39 | 15.8 | | 63.9 | 70.3 | - |
| Bigg Red | 4 | 28.3 | 98.4 | 2.3 | - | 0.00 | 15.0 | 106 | 63.7 | 66.0 | _ |
| 2004 West Fai | rgo, N | ID Untreate | d | | | | A. 34.54.54.54.54.54.54.54.54.54.54.54.54.54 | uniniminimi meti | | | |
| Vantage | 4 | 32.3 | 86.4 | 3.3 | - | 2.38 | 15.0 | 92 | 64.2 | 73.4 | _ |
| Granite | 4 | 32.0 | 90.2 | 3.8 | - | 2.31 | 15.0 | 90 | 64.1 | 76.5 | |
| Alsen | 4 | 27.8 | 93.3 | 3.5 | _ | 0.00 | 14.9 | | 62.8 | 69.8 | _ |
| Bigg Red | 4 | 27.8 | 94.0 | 4.0 | - | 0.00 | 13.4 | 99 | 63.0 | 61.5 | - |

| lar | NP 1 | COL | ntinued | ı |
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| Variety | n | Heading -days from 6-1- | Height -cm- | Leaf Rust 1-7 ¹ | Foliar Disease 1-7 ¹ | VSK ¹ -%- | Protein -%- | Sed ² -mm- | Test Weight -lbs/bu- | Yield -bu/a- | FN ³ sec |
|---|--------|---|---|--|---------------------------------------|--|--|---|---|---|------------------------|
| | i | | | | | | | | | | |
| 2004 Casselt | on, N | D | | | | | | | | | |
| Vantage | 3 | 29.3 | 96.5 | _ | - | 0.7 | 14.7 | 96 | 64.4 | 83.8 | - |
| Granite | 3 | 29.7 | 94.0 | - | - | 1.3 | 14.2 | 88.0 | 64.4 | 75.7 | - |
| Alsen | 3 | 23.0 | 100.8 | - | _ | 0.0 | 14.6 | | 63.9 | 82.4 | _ |
| Bigg Red | 3 | 24.0 | 98.2 | <u></u> | - | 0.0 | 13.2 | 105 | 63.7 | 85.3 | - |
| 2004 Belfield | , ND | | *************************************** | Cretrattin't d'attin'tuerte-concernences | | | | | | | |
| Vantage | 3 | 27.7 | 64.3 | | - | - | 15.2 | 101 | 63.6 | 43.2 | - |
| Granite | 3 | 27.3 | 61.0 | _ | - | ·Ydrddharannannan | 15.1 | 102 | 63.1 | 42.7 | - |
| Alsen | 3 | 23.7 | 71.1 | _ | - | - | 14.2 | | 61.1 | 45.1 | - |
| Bigg Red | 3 | 25.0 | 73.7 | - | - | - | 14.1 | 105 | 62.2 | 46.4 | _ |
| 2005 Gary, M | J N | | | VANSONIANIANIANIANIANIANIANI | | | | | | | |
| Vantage | 4 | 27.8 | 81.9 | | 5.0 | 8.0 | 15.5 | 89 | 60.2 | 77.97 | - |
| Granite | 4 | 30.0 | 78.7 | _ | 5.0 | 16.0 | 16.0 | 96 | 59.7 | 74.46 | - |
| Alsen | - | - | | - | - 0.0 | - | - 10.0 | - | | | ~ |
| Bigg Red | - | - | - | | - | - | _ | - | - | _ | _ |
| onenen ven von en | | | | utti kili selvet selven sensensense | | , , , , , , , , , , , , , , , , , , , | 1. Principal (1. | | | | |
| 2005 Valley C | 7 | | | | | | | | | | |
| Vantage | 4 | 31.5 | 74.3 | 4 | - | 1.0 | 15.5 | 84 | 60.8 | 44.09 | _ |
| Granite | 4 | 32.0 | 74.3 | 4 | _ | 3.3 | 15.4 | 90 | 59.3 | 35.37 | |
| Alsen | 4 | 27.5 | 74.9 | 2 | - | 1.7 | 15.3 | 113 | 59.8 | 40.37 | - |
| Bigg Red | 4 | 28.0 | 80.8 | 5 | - | 0.7 | 13.4 | 98 | 59.4 | 33.08 | |
| 2005 Bristol, | SD | 1 | | | | ommunioni on on property of the contract of th | of the state of th | | | | |
| Vantage | 4 | 23.0 | - | 5.0 | _ | 12.7 | 15.7 | 87 | 55.6 | 49.95 | _ |
| Granite | 4 | 23.3 | - | 4.5 | - | 25.0 | 15.7 | 97 | 55.9 | 46.88 | - |
| Alsen | 4 | 19.8 | - | 6.0 | _ | 5.0 | 15.6 | 119 | 60.6 | 61.60 | _ |
| Bigg Red | 4 | 19.3 | - | 6.0 | | 1.7 | 14.0 | 97 | 61.3 | 74.10 | - |
| 2005 Casselto | n. NC |) Demo | | | | | - manadorn - mar ed an - ed a 1 de algunt par | | | | |
| Vantage | 1 | - [| _ | - | - 1 | 1.4 | 16.9 | 93 | 60.9 | 74.3 | |
| Granite | 1 | - | - | _ | - | 6.2 | 16.6 | 95 | 59.6 | 64.6 | - |
| Alsen | | | _ | - | _ | | | *************************************** | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | _ |
| Bigg Red | 1 | - | - | | | 0.1 | 14.6 | 96 | 60.2 | 72.6 | _ |
| 2005 Belfield, | ND | namandroven deli-sectoristica della constanta | | | | | (nperpresented and | | | | |
| Vantage | 4 | 31.0 | 83.8 | - | | | 15.0 | 95 | 64.2 | 65.46 | _ |
| Granite | 4 | 29.8 | 83.2 | - | | - | 14.7 | 95 94 | 64.1 | 62.31 | |
| Alsen | 4 | 26.3 | 87.6 | hv#v#tv#vmurtr#mund | - [| | 14.7 | 113 | 62.8 | 67.10 | |
| Bigg Red | 4 | 28.0 | | | | | | 1 | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | *************************************** | |
| Digg Red | 4 | ∠0.U | 84.6 | | | - | 13.0 | 88 | 63.0 | 62.95 | |

| Variety | n | Heading -days from 6-1- | Height -cm- | Leaf Rust 1-7 ¹ | Foliar Disease 1-71 | VSK ¹ -%- | Protein -%- | Sed ² | Test Weight -lbs/bu- | Yield -bu/a- | FN ³ |
|--|----------|-------------------------------|-------------------------|---|---|-------------------------|--|--|-----------------------------|---|-----------------------------|
| , | | | | | | | | | | | |
| 2005 Steele, I | VD Fi | ıngicide | <u> </u> | | | | | | | annan manan ambit p Assault | |
| Vantage | 4 | 31.5 | 80.6 | _ | _ | 3.0 | 16.7 | 87 | 61.4 | 53.4 | _ |
| Granite | 4 | 31.5 | 81.3 | _ | - | 4.7 | 16.7 | 95 | 60.8 | 50.1 | _ |
| Alsen | 4 | 28.0 | 81.3 | _ | _ | 1.7 | 15.8 | 108 | 60.3 | 51.8 | _ |
| Bigg Red | 4 | 30.0 | 91.4 | - | - - | 0.7 | 14.7 | 96 | 61.8 | 56.8 | _ |
| 2.99 | | | <u> </u> | | | | Annual de Albertania de Albert | | 0.,0 | | |
| 2005 Steele, I | ND Ur | ntreated | | . } | | | | | 1 | | 1 |
| Vantage | 4 | 31.0 | 80.6 | 2 | - | 3.0 | 16.3 | 86 | 60.9 | 46.1 | - |
| Granite | 4 | 32.0 | 81.3 | 2 | - | 6.3 | 17.0 | 96 | 59.6 | 39.7 | - |
| Alsen | 4 | 27.0 | 81.3 | 3 | - | 1.7 | 15.2 | 113 | 59.6 | 43.1 | - |
| Bigg Red | 4 | 29.5 | 91.4 | 5 | <u> </u> | 1.7 | 14.7 | 96 | 60.0 | 41.2 | _ |
| | 1 | | | | | | <u> </u> | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | | ,,,.,.,.,.,,.,,.,,,,,,,,,,, |
| 2005 Felton, I | ΜN Fι | ıngicide | 1 | | | unainieiminieuaiauaia | <u> </u> | | | annaman america et set égléphe hacitaces. | |
| Vantage | 4 | 31.5 | 80.0 | _ | | 3.0 | 15.6 | 100 | 62.3 | 73.4 | _ |
| Granite | 4 | 31.0 | 78.7 | - | - | 2.0 | 16.3 | 104 | 61.2 | 73.1 | - |
| Alsen | 4 | 28.0 | 81.3 | _ | _ | 1.3 | 15.2 | 118 | 60.1 | 59.5 | - |
| Bigg Red | 4 | 29.5 | 81.3 | | _ | 0.0 | 14.3 | 111 | 60.9 | 67.8 | _ |
| | | | uunuutuhuttht4tin4HtHtr | H19869H19748C3H47H1974PF | | | | umanamanumenreisH/br/F | | | |
| 2005 Felton, N | MN U | ntreated | | | | | 1 | | | | |
| Vantage | 4 | 32.5 | 80.0 | _ | - | 2.3 | 15.6 | 106 | 62.0 | 77.2 | _ |
| Granite | 4 | 31.5 | 80.0 | _ | - | 3.0 | 16.1 | 103 | 61.8 | 74.2 | _ |
| Alsen | 4 | 28.5 | 80.0 | - | - | 1.3 | 14.9 | 117 | 60.4 | 60.8 | - |
| Bigg Red | 4 | 30.5 | 82.6 | _ | _ | 0.3 | 13.8 | 113 | 61.6 | 70.3 | _ |
| | | | | nanwhanenwisenmastarische | | | | ALL STATE OF THE S | | | |
| 2006 Casselto | n, NI |) | 1 | | | imraininmininminimi) | | | | | |
| Vantage | 4 | 25.3 | 78.7 | - | - | _ | 16.3 | 107 | 63.2 | 76.8 | - |
| Granite | 4 | 25.0 | 82.6 | - | - | _ | 16.2 | 107 | 63.3 | 77.6 | - |
| Alsen | 4 | 19.5 | 81.3 | - | _ | - | 15.7 | 117 | 62.9 | 74.7 | _ |
| Bigg Red | 4 | 22.3 | 88.9 | - | - | - | 13.7 | 109 | 63.5 | 71.7 | _ |
| | | | | rocenales hards of sel filts drabs blob | Companied and comes on a bid command or community | | | roman, dans brimman | | | l-P-hummile min |
| 2006 Gary, MN | 4 | | | - 'ensetsnammanaetsetteeteete | | | | and the second s | | | |
| Vantage | 4 | 24.5 | 80.0 | _ | - | - | 15.1 | 100 | 63.9 | 87.2 | - |
| Granite | 4 | 23.3 | 76.2 | _ | - | - | 14.3 | 100 | 63.9 | 82.1 | - |
| Alsen | - | - | | _ | | | - | - | - | - | - |
| Bigg Red | 4 | 23.0 | 96.5 | - | - | _ | 14.0 | 108 | 64.6 | 91.1 | - |
| - And the second se | | | | | | | | | manunununun vided videbilet | | |
| 2006 Coopers | town | , ND | | | | | | | | | |
| Vantage | 4 | 27.0 | - | - | - | - | - | - | - | 35.5 | _ |
| Granite | 4 | 26.0 | _ | nmuramunutvaunut-helit | | _ | - | - | - | 35.2 | _ |
| Alsen | - | - | - | _ | - | | - | _ | - | | - |
| Bigg Red | 4 | 26.5 | - | _ | - | - | - | - | - | 34.1 | - |
| | | | | | M-H | | | | | | |

| lar | ne ' | 1. co | ntını | ied. |
|-----|------|-------|-------|------|

| Variety | n | Heading -days from 6-1- | Height | Leaf Rust 1-7 ¹ | Foliar Disease 1-7 ¹ | VSK ¹ -%- | Protein -%- | Sed ² -mm- | Test Weight -lbs/bu- | Yield -bu/a- | FN ³ sec |
|--|------------|-------------------------------|----------|----------------------------------|---|---|--|--|---|--|---|
| | | | | | | | | | | | |
| 2006 Felton, | MN - | No fungicide | 3 | | | | | | | nuainunumum-niev | *************************************** |
| Vantage | 4 | 25.0 | 61.6 | _ | - | _ | - | _ | - | 37.5 | _ |
| Granite | 4 | 24.5 | 61.0 | - | - | _ | - | - | - | 37.7 | - |
| Alsen | - | - | - | - | - | _ | - | - | _ | - | _ |
| Bigg Red | 4 | 23.8 | 68.6 | _ | _ | _ | _ | _ | _ | 42.0 | |
| 2006 Garriso | n. ND | | | nderandradish de Herritan | | invalmimin walailiina | | | | | |
| Vantage | 4 | 40.0 | 59.7 | _ | _ | _ | - | - | - | 55.6 | - |
| Granite | 4 | 38.8 | 61.6 | H-Hudt-n/muturdrn-nummu | _ | _ | - | _ | _ | 55.1 | - |
| Alsen | | - | - | | - | | - | _ | _ | - | _ |
| Bigg Red | 4 | 39.8 | 69.9 | | | | | | - | 52.3 | |
| 2006 Courings | | | | | | | | | | | |
| 2006 Carringt | 7 | A | | | | | | mrnenen selvet stårbladd om | | 27.6 | |
| Vantage Granita | 4 | 26.7 | - | | - | | _ | ~ | | 37.6 25.1 | |
| Granite | 4 | 25.0 | | | - | | <u> </u> | ainiaiauaia-aiaua | | 35.1 | |
| Alsen | ļ <u>-</u> | - | - | - | - | _ | - | | - | - | - |
| Bigg Red | 4 | 25.3 | - | _ | | <u></u> | _ | | - - - - - - - - - - - - - - - - - - - | 40.0 | _ |
| 2006 Langdor | ր, ND | //hdm//dun-nengananananan | | | | | | | | | |
| Vantage | 4 | 43.8 | 80.6 | _ | 7.5 | Handerson abreller abreller abreller der abreller der abreller der abreller der abreller der abreller der abrelle | _ | _ | - | 75.0 | |
| Granite | 4 | 43.8 | 81.9 | - | 7.0 | _ | - | | - | 71.0 | - |
| Alsen | _ | - | - 1 | - | | - | - | _ | _ | _ | _ |
| Bigg Red | 4 | 44.3 | 91.4 | _ | 7.5 | _ | - | | _ | 71.5 | - |
| 2006 Leeds, N | lD | | | | | orazan, paran caran quan | | | | | *************************************** |
| Vantage | 4 | 38.0 | 69.4 | - | - | - | - | _ | _ | 61.3 | _ |
| Granite | 4 | 36.5 | 73.7 | | _ | - | <u></u> | _ | | 62.0 | - |
| Alsen | _ | _ | _ | - | _ | _ | - | _ | _ | _ | - |
| Bigg Red | 4 | 38.0 | 80.4 | - | - | - | - | | - | 69.7 | - |
| | | | | | 1 | | | | jennumanumanvotah | .,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | |
| 2006 Ray, ND | | | | | | | 1 | | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | |
| Vantage | 4 | 35.0 | 59.1 | _ | - | - | - | _ | - 1 | 28.5 | _ |
| Granite | 4 | 34.3 | 57.2 | - | _ | _ | - | - | - | 32.1 | - |
| Alsen | - ! | - | - | _ | _ | _ | - . | _ | - | _ | _ |
| Bigg Red | 4 | 34.3 | 65.4 | - | - | _ | - | manamenturkahiriteki-kisti | - | 20.5 | - |
| ······································ | | | E . | | | | | | manusuman armaharman armah shib | | |
| 2006 Westhop | e, NC |) | 1 | чинин нененене | hidembroomroomroom | serneshernern vrnerh sherrisn | V-300914 P-010 H-010 P-010 P-0 | | | | |
| Vantage | 4 | 34.0 | 73.7 | _ | - 1 | _ | - | _ | - | 71.0 | _ |
| Granite | 4 | 32.5 | 71.1 | _ | - ! | - | - | - | _ | 71.3 | _ |
| Alsen | - | - | | - | <u> </u> | _ | - | _ | - | - | - |
| Bigg Red | 4 | 33.8 | 85.5 | _ | - | _ | _ | _ | _ | 73.1 | _ |
| | , T | | 00.0 | | 111111111111111111111111111111111111111 | | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | rampangraphydan. |
| ************************************** | | | | | | | | | | ninunununununununun h | - Martin Community |
| | 4 | | | | | | | .mienaimiainimimia | | ((-4-4)-4-4-4-4-4-4-4-4-4-4-4-4-4-4-4-4- | |

| Variety | n | Heading -days from 6-1- | Height -cm- | Leaf Rust 1-7 ¹ | Foliar Disease 1-7 ¹ | VSK ² -%- | Protein -%- | Sed ³ -mm- | Test Weight -lbs/bu- | Yield -bu/a- | FN ⁴ sec |
|----------------------|-------|-------------------------------|---|----------------------------------|---|-------------------------|--|---------------------------------|--------------------------------------|--|------------------------|
| 2006 Fisher, I | /N Fu | Jnaicide | and a second | | | | and the same of th | | | , postero de la composición della composición de | |
| Vantage | 3 | 24.3 | - 1 | _ | - | _ | 16.6 | 102 | 61.9 | 39.3 | _ |
| Granite | 3 | 24.0 | - | - | - | - | 16.2 | 101 | 62.1 | 49.2 | - |
| Alsen | 3 | 18.0 | - | _ | _ | - | 14.4 | 120 | 63.7 | 51.1 | _ |
| Bigg Red | 3 | 18.3 | | | _ | - | 12.8 | 107 | 63.8 | 54.2 | _ |
| 2006 Fisher, N | /IN U | ntreated | | | | | | | | | |
| Vantage | 3 | 24.0 | - | _ | - | - | 14.5 | 94 | 64.4 | 66.74 | - |
| Granite | 3 | 23.0 | _ | _ | - | _ | 14.7 | 97 | 64.0 | 63.21 | _ |
| Alsen | 3 | 19.0 | - | - | - | - | 14.0 | 116 | 64.2 | 66.49 | _ |
| Bigg Red | 3 | 20.0 | - | - = | | | 12.7 | 107 | 65.0 | 76.58 | _ |
| 2006 Crystal, | ND | | *************************************** | | | | | | | | |
| Vantage | 3 | 26.7 | | - | manusion in the second | - | 14.9 | 93 | 64.6 | 67.7 | |
| Granite | 3 | 25.7 | - | - | | | 15.4 | 102 | 64.8 | 67.1 | - |
| Alsen | 3 | 23.0 | - | - | - | - | 14.2 | 115 | 64.2 | 71.4 | - |
| Bigg Red | 3. | 24.7 | - | - | _ | _ | 11.5 | 98 | 64.4 | 74.6 | - |
| 2006 Thomps | on, N | D | | | | | | an managaran | sum i nsmin (mustanti stemi striktir | , par, par, par en partie de la composition della composition della composition de la composition della composition della composition dell | |
| Vantage | 3 | 26.7 | - | - | | - | 15.7 | 106 | 63.6 | 52.8 | 471 |
| Granite | 3 | 26.3 | - | - | - | - | 16.4 | 104 | 62.5 | 49.0 | 409 |
| Alsen | 3 | 23.3 | - | _ | | - | 16.2 | 116 | 63.3 | 58.5 | 452 |
| Bigg Red | 3 | 24.7 | - | _ | - | _ | 14.4 | 107 | 64.0 | 64.6 | 500 |
| ا 2006 St. Hilair | e, MN | , | shnamatiffetaHt+Hoets\rmananara | vhimminiminimimi | | | nuunuunuunummum Hud | pr, persentation and the second | | | |
| Vantage | 3 | 27.3 | _ | _ | _ | <u></u> | 16.8 | 105 | 62.1 | 43.6 | - |
| Granite | 3 | 26.3 | _ | _ | _ | _ | 16.3 | 107 | 63.1 | 40.9 | |
| Alsen | 3 | 24.3 | - | - | - | | 15.5 | 117 | 63.0 | 45.5 | _ |
| Bigg Red | 3 | 26.3 | - | - | - | - | 15.6 | 115 | 61.7 | 39.8 | _ |

Summary of Vantage, Granite, Alsen and Bigg Red Over 22 Locations in ND, SD, and MN from 2004 to 2006

| DOT TO MODE | | | | | | | | | | |
|--------------|------|--|-----|-----|-----|------|-------|------|------|------------|
| No. Locs. | 21 | 16 | 5 | 1 | 14 | 22 | 16 | 22 | 22 | 2 |
| Vantage | 30.7 | 80.8 | 3.3 | 3.0 | 2.8 | 15.1 | 96.0 | 62.4 | 57.9 | 366.0 |
| Granite | 30.9 | 81.8 | 3.2 | 2.0 | 4.6 | 15.3 | 97.9 | 62.3 | 57.1 | 332.5 |
| Alsen | 26.7 | 85.1 | 3.3 | 2.0 | 1.3 | 14.8 | 115.3 | 62.1 | 56.4 | 369.0 |
| Bigg Red | 28.1 | 90.3 | 4.5 | 2.0 | 0.5 | 13.5 | 102.4 | 62.5 | 57.8 | 400.5 |
| Po Mehanna | | 4- | | | | | | | | |
| and the same | | | | | | | | | | helpsharra |
| l | | | | | | | | | | İ |

Table 1 continued

| Variety | n | Heading -days from 6-1- | Height -cm- | Leaf Rust 1-7 ¹ | Foliar Disease 1-7 ¹ | VSK ² -%- | Protein -%- | Sed ³ -mm- | Test Weight -lbs/bu- | Yield -bu/a- | FN ⁴ sec |
|----------------|------|-------------------------------|----------------|----------------------------------|---------------------------------------|-------------------------|-------------|--------------------------|----------------------------|-----------------|------------------------|
| Comparison | of V | antage an | d Granite | Over 3 | 3 Locatio | ns in NC |), SD and | MN fro | m 2004 t | o 2006 | |
| No. Locs. | | 31 | 24 | 5 | 3 | 16 | 25 | 23 | 25 | 33 | 2 |
| Vantage | | 31.2 | 77.5 | 3.3 | 5.2 | 3.0 | 15.2 | 95.9 | 62.3 | 58.0 | 366.0 |
| Granite | | 31.2 | 77.9 | 3.2 | 4.7 | 5.4 | 15.4 | 97.9 | 62.2 | 56.9 | 332.5 |
| ANOV F statist | | ns ⁵ | ns | ns | ns | .0165 | ns | ns | ns | ns | ns |

¹Disease rating scored 1=resistant to 7=susceptible.

²% of visually scabby kernels (VSK).

³Flour SDS sedimentation value, a measure of gluten strength.

⁴FN=falling numbers.

⁵ns=difference not significant.

Table 2. Mean agronomic data reported for 20 north central locations of the 2006 Hard Red Spring

Wheat Uniform Regional Nursery.

| Line | Yield Bu/Ac | | 1 | t Wt. | Heading | Height | Lodging ² | Protein | |
|---------------|----------------|------|------|-------|------------|--------|----------------------|---------|--|
| | į. | 4 | 1 | /Bu | d from 6-1 | cm | 0-9 | % | |
| No. Locations | 19 | Rank | 19 | Rank | 17 | 19 | 3 | .10 | |
| MN03358-4 | 64.8 | 11 | 60.4 | 19 | 23 | 80 | 1.7 | 14.3 | |
| SD3868 | 63.1 | 2 | 59.4 | 29 | 21 | 89 | 0.9 | 13.3 | |
| MN02255 | 63.0 | 3 | 60.1 | 23 | 21 | 80 | 0.4 | 14.4 | |
| SD3943 | 61.9 | 4 | 60.8 | 12 | 19 | 82 | 0.3 | 13.5 | |
| MT 0416 | 61.8 | 5 | 59.5 | 27 | 22 | 79 | 1.7 | 13.7 | |
| MT 0415 | 61.5 | 6 | 60.1 | 23 | 22 | 83 | 0.3 | 14.6 | |
| SD3944 | 61.4 | 7 | 60.4 | 19 | 19 | 84 | 2.2 | 13.9 | |
| MN02252-A | 61.2 | 8 | 60.3 | 21 | 23 | 83 | 0.7 | 14.6 | |
| WA007998 | 61.1 | 9 | 58.1 | 38 | 20 | 79 | 1.2 | 14.3 | |
| SD3851 | 60.9 | 10 | 61.8 | 1 | 18 | 85 | 1.2 | 14.4 | |
| Verde | 60.9 | 10 | 59.5 | 27 | 23 | 77 | 0.3 | 14.4 | |
| BW864 | 60.4 | 12 | 60.9 | 8 | 20 | 81 | 0.3 | 15.0 | |
| CA905-752 | 60.4 | 12 | 59.6 | 26 | 21 | 71 | 0.3 | 14.4 | |
| ND04/3-19 | 60.3 | 14 | 58.9 | 35 | 24 | 82 | 0.2 | 14.0 | |
| 98S0051-1-14 | 59.9 | 15 | 60.7 | 14 | 21 | 76 | 0.0 | 14.2 | |
| NE-188-24 | 59.9 | 15 | 57.3 | 40 | 24 | 78 | 0.6 | 13.5 | |
| ND04/3-18 | 59.7 | 17 | 61.8 | 1 | 20 | 81 | 0.5 | 14.4 | |
| MN02072-7 | 59.7 | 17 | 61.6 | 4 | 20 | 74 | 0.3 | 14.6 | |
| NE-108-46 | 59.6 | 19 | 59.0 | 33 | 22 | 76 | 0.8 | 13.5 | |
| NDSW0430 | 59.5 | 20 | 61.2 | 7 | 22 | 81 | 1.0 | 14.3 | |
| BZ901-543W | 59.3 | 21 | 59.3 | 31 | 20 | 82 | 1.5 | 14.2 | |
| ND04/3-21 | 58.8 | 22 | 61.5 | 6 | 20 | 81 | 0.2 | 14.7 | |
| 2375 | 58.6 | 23 | 60.5 | 18 | 21 | 82 | 0.4 | 13.8 | |
| SD4001 | 58.5 | 24 | 60.7 | 14 | 21 | 83 | 0.0 | 13.9 | |
| ND04/3-20 | 58.2 | 25 | 59.0 | 33 | 23 | 92 | 0.2 | 14.2 | |
| ND03/1-13 | 57.4 | 26 | 60.7 | 14 | 20 | 84 | 0.5 | 14.3 | |
| MN03306-1 | 56.9 | 27 | 60.7 | 14 | 20 | 78 | 0.6 | 14.3 | |
| 99S0362-21 | 56.7 | 28 | 60.9 | 8 | 21 | 71 | 0.0 | 14.4 | |
| 98S0113-20-23 | 56.2 | 29 | 60.9 | 8 | 19 | 71 | 0.1 | 15.4 | |
| BW379 | 55.7 | 30 | 61.6 | 4 | 19 | 82 | 0.9 | 15.1 | |
| 05M SP5 | 55.7 | 30 | 60.9 | 8 | 22 | 79 | 0.9 | 14.9 | |
| BW342 | 55.7 | 30 | 60.8 | 12 | 21 | 86 | 0.7 | 14.8 | |
| NDSW0481 | 55.0 | 33 | 59.4 | 29 | 23 | 85 | 1.3 | 14.7 | |
| PT436 | 54.9 | 34 | 59.2 | 32 | 21 | 89 | 0.9 | 14.7 | |
| CA902-704 | 54.5 | 35 | 61.7 | 3 | 26 | 78 | 0.0 | 15.4 | |
| NDSW0449 | 54.4 | 36 | 60.0 | 25 | 25 | 84 | 0.0 | 14.9 | |
| Keene | 54.0 | 37 | 60.3 | 21 | 23 | 95 | 1.8 | 14.6 | |
| CA905-751 | 54.0 | 37 | 57.7 | 39 | 25 | 71 | 0.2 | 14.7 | |
| Chris | 43.9 | 39 | 58.5 | 36 | 24 | 99 | 2.0 | 15.2 | |
| Varquis | 42.1 | 40 | 58.2 | 37 | 25 | 103 | 1.8 | 14.4 | |
| Mean | 58.1 | - 1 | 60.1 | | 21.6 | 81.9 | 0.7 | 14.4 | |

¹Taken from Table 23 of the 2006 Hard Red Spring Wheat Uniform Regional Nursery Report. Locations are Crookston, Morris, Sabin and St. Paul, MN; Carrington, Casselton, Langdon, Minot, Prosper and Williston, ND; Brookings, Groton and Selby, SD; Bozeman and Sidney, MT; Sidney, NE; Pullman, WA; Powell, WY; Swift Current, SK; and Winnipeg,MB.

²Lodging scored 0 (least) to 9 (highest).

| Table 3 | 2006 Hard Red Spring | n Wheat Uniform | Regional Nursery | Langdon ND ¹ . |
|----------|----------------------|------------------|-------------------|---------------------------|
| labic s. | Todo Hara Mea Obini | j trucat Omionii | rtegional Hulbery | Languon, ND . |

| Line | Yield | Test Wt. | Heading | Height | Lodging | Leaf Rust | Leaf Disease |
|---------------|-------|----------|------------|--------|---------|-------------|-----------------|
| WINY 1111 | Bu/Ac | Lb/Bu | d from 6-1 | cm | 0-9 | <u>%</u> | % Flag Leaf |
| MN02255 | 80.0 | 61.2 | 30 | 91 | 1.3 | 0.0 | 1.7 |
| MN03358-4 | 80.0 | 61.0 | 34 | 96 | 2.0 | 0.1 | 1.7 |
| NE-188-24 | 77.5 | 56.4 | 35 | 91 | 1.7 | 0.0 | 2.3 |
| Verde | 76.5 | 60.5 | 34 | 91 | 0.7 | 0.0 | 2.0 |
| SD3868 | 75.2 | 60.3 | 34 | 108 | 2.7 | 0.7 | 2.3 |
| MN02252-A | 75.0 | 60.8 | 33 | 95 | 2,0 | 1.3 | 6.0 |
| NDSW0430 | 72.8 | 61.3 | 32 | 94 | 2.3 | 0.0 | 5.7 |
| ND04/3-20 | 71.7 | 60.0 | 34 | 107 | 0.7 | 0.7 | 2.7 |
| MN02072-7 | 71.0 | 62.2 | 30 | 82 | 1.0 | 0.7 | 3.0 |
| NE-108-46 | 71.0 | 58.9 | 32 | 88 | 1.7 | 1.0 | 8.3 |
| SD3851 | 71.0 | 62.6 | 28 | 94 | 1.0 | 0.0 | 3.7 |
| 2375 | 70.6 | 61.3 | 32 | 100 | 1.0 | 1.4 | 4.0 |
| ND03/1-13 | 70.5 | 61.7 | 30 | 97 | 0.7 | 0.3 | 1.7 |
| BW379 | 69.6 | 62.1 | 29 | 92 | 2.0 | 1.3 | 4.0 |
| CA905-751 | 69.3 | 58.7 | 35 | 79 | 0.7 | 0.0 | 3.0 |
| ND04/3-21 | 68.9 | 62.5 | 29 | 93 | 0.7 | 0.0 | 5.0 |
| ND04/3-18 | 68.7 | 62.7 | 30 | 94 | 0.7 | 0.0 | 13.3 |
| 98S0051-1-14 | 68.5 | 61.6 | 31 | 87 | 0.0 | 0.1 | 2.3 |
| BZ901-543W | 68.5 | 59.7 | 30 | 96 | 2.3 | 2.3 | 3.0 |
| 99S0362-21 | 68.3 | 61.8 | 31 | 80 | 0.0 | 1.7 | 3.0 |
| ND04/3-19 | 68.3 | 60.3 | 34 | 92 | 0.7 | 0.0 | 2.0 |
| MN03306-1 | 67.8 | 61.3 | 30 | 94 | 1.0 | 0.0 | 3.7 |
| SD3943 | 67.7 | 60.7 | 29 | 93 | 1.0 | 0.0 | 1.7 |
| 05M SP5 | 67.4 | 60.5 | 33 | 93 | 1.0 | 1.3 | 3.3 |
| BW864 | 67.1 | 61.3 | 30 | 90 | 1.0 | 1.7 | 11.7 |
| SD4001 | 67.1 | 61.0 | 31 | 101 | 0.0 | 0.0 | 2.3 |
| SD3944 | 66.9 | 60.1 | 29 | 98 | 1.3 | 0.0 | 1.0 |
| CA905-752 | 66.8 | 59.1 | 31 | 81 | 1.0 | 0.7 | 2.0 |
| BW342 | 66.6 | 61.8 | 31 | 97 | 2.0 | 0.0 | 2.0 |
| NDSW0481 | 65.6 | 60.6 | 32 | 100 | 1.3 | 1.7 | 2.0 |
| MT 0416 | 64.9 | 59.7 | 31 | 90 | 2.7 | 0.7 | 2.7 |
| CA902-704 | 64.2 | 62.9 | 35 | 89 | 0.0 | 1.0 | 2.3 |
| WA007998 | 63.3 | 57.7 | 30 | 90 | 1.7 | 11.7 | 15.0 |
| 98S0113-20-23 | 63.1 | 60.7 | 28 | 78 | 0.3 | 0.4 | 4.0 |
| PT436 | 62.0 | 60.4 | 31 | 71 | 1.7 | 1.4 | 3.0 |
| MT 0415 | 61.8 | 60.0 | 32 | 95 | 0.3 | 6.0 | 13.3 |
| Keene | 59.8 | 60.2 | 33 | 118 | 1.0 | 1.7 | 3.3 |
| NDSW0449 | 55.8 | 60.7 | 35 | 96 | 0.0 | 0.1 | 1.3 |
| Chris | 47.2 | 59.6 | 36 | 116 | 3.3 | 0.7 | 1.7 |
| Marquis | 47.0 | 60.6 | 36 | 121 | 3.0 | 2.4 | 5.3 |
| Mean | 67.6 | 60.7 | 31.7 | 93.9 | 1.2 | 1.1 | 4.1 |
| LSD | 9.2 | 1.1 | 1.1 | 14.9 | 1.6 | • 2.8 | 5.7 |
| CV | 8.4 | 1.1 | 1.2 | 9.7 | 81.0 | <u>2.</u> 0 | 86.9 |
| → | 0.4 | 1.1 | 1.4 | 9.1 | Q 1.U | 107.0 | 55.5 |

¹Taken from Table 9 of the 2006 Hard Red Spring Uniform Regional Nursery Report.

Table 4. 2006 Hard Red Spring Wheat Uniform Regional Nursery, Carrington, ND¹.

| Line | Yield Bu/Ac | Test Wt. Lb/Bu | Heading d from 6-1 | Height cm | | Protein | 1000 KWT | Leaf Disease % flag leaf |
|---------------|----------------|----------------------|--------------------|-----------|-------|---------|--|--------------------------------|
| SD3868 | 54.6 | 59.5 | 19 | 83 | 0.0 | 13.1 | 33.0 | 23.3 |
| ND04/3-20 | 51.4 | 57.8 | 19 | 86 | 0.0 | 15.5 | 25.4 | 13.3 |
| MT 0415 | 51.2 | 60.1 | 19 | 74 | 0.7 | 15.5 | 27.5 | 13.3 |
| ND03/1-13 | 51.2 | 60.5 | 15 | 74 | 0.7 | 15.1 | 28.1 | 23.3 |
| CA902-704 | 51.1 | 61.5 | 23 | 75 | 0.0 | 16.1 | 24.7 | 10.0 |
| MN02252-A | 51.0 | 60.6 | 19 | 74 | 0.0 | 15.5 | 27.3 | 20.0 |
| MN02255 | 50.6 | 60.3 | 18 | 69 | 0.0 | 15.4 | 26.4 | 23.3 |
| MN03358-4 | 50.6 | 60.3 | 18 | 66 | 0.0 | 14.9 | 27.3 | 20.0 |
| CA905-752 | 49.8 | 59.5 | 19 | 64 | 0.0 | 15.0 | 26.3 | 16.7 |
| SD3944 | 49.3 | 60.8 | 15 | 72 | 0.3 | 14.8 | 27.5 | 20.0 |
| MN02072-7 | 48.5 | 62.7 | 16 | 65 | 0.0 | 15.8 | 29.6 | 23.3 |
| SD3943 | 48.2 | 60.9 | 14 | 69 | 0.0 | 14.7 | 27.1 | 23.3 |
| 2375 | 48.0 | 60.8 | 16 | 72 | 0.3 | 15.1 | 30.4 | 23.3 |
| SD3851 | 47.9 | 62.5 | 14 | 71 | 0.7 | 15.0 | 29.7 | 16.7 |
| NDSW0430 | 47.5 | 61.4 | 18 | 75 | 0.7 | 15.0 | 28.0 | 16.7 |
| NE-108-46 | 47.1 | 59.8 | 18 | 68 | 0.7 | 13.9 | 28.8 | 13.3 |
| NE-188-24 | 47.0 | 56.1 | 20 | 69 | 0.0 | 13.8 | 24.9 | 20.0 |
| 98S0051-1-14 | 46.5 | 61.0 | 17 | 68 | 0.0 | 15.8 | 29.0 | 26.7 |
| MN03306-1 | 46.4 | 60.4 | 16 | 66 | 0.7 | 15.0 | 22.1 | 16.7 |
| | 46.3 | 61.0 | 16 | 69 | 0.0 | 15.0 | 29.3 | 26.7 |
| BW864 | - | | · | | | H | | 10.0 |
| CA905-751 | 46.3 | 56.9 | 21 | 66 | 0.0 | 15.7 | 25.8 26.9 | 20.0 |
| ND04/3-21 | 46.1 | 61.4 | 16 | 68 | 0.0 | 15.6 | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | |
| ND04/3-18 | 45.0 | 60.6 | 17 | 70 | 0.7 | 15.6 | 25.4 | 20.0 |
| Verde | 44.4 | 59.0 | 19 | 71 | 0.3 | 15.2 | 28.3 | 16.7 |
| 98S0113-20-23 | 44.0 | 62.1 | 15 | 64 | 0.0 | 16.1 | 30.1 | 13.3 |
| 05M SP5 | 43.9 | 60.9 | 18 | 75 | 1.7 | 16.1 | 26.6 | 20.0 |
| ND04/3-19 | 42.6 | 57.9 | 20 | 74 | 0.0 | 15.2 | 26.9 | 16.7 |
| WA007998 | 42.3 | 58.0 | 15 | 67 | 2.0 | 15.7 | 32.8 | 20.0 |
| BZ901-543W | 42.2 | 60.2 | 16 | 69 | 2.3 | 14.7 | 32.7 | 20.0 |
| PT436 | 42.2 | 60.3 | 18 | 82 | 1.0 | 15.2 | 27.4 | 20.0 |
| NDSW0449 | 42.0 | 59.2 | 21 | 77 | 0.0 | 16.0 | 24.0 | 10.0 |
| BW342 | 41.4 | 60.9 | 18 | 77 | 0.0 | 15.7 | 26.6 | 20.0 |
| SD4001 | 41.0 | 60.4 | 17 | 71 | 0.0 | 15.0 | 25.4 | 13.3 |
| MT 0416 | 40.9 | 60.6 | 18 | 69 | 2.3 | 14.3 | 26.9 | 33.3 |
| 99\$0362-21 | 39.9 | 60.9 | 18 | 60 | 0.0 | 15.8 | 28.6 | 20.0 |
| Keene | 39.8 | 59.7 | 20 | 89 | 1.3 | 15.6 | 25.1 | 16.7 |
| BW379 | 38.6 | 62.0 | 14 | 68 | 0.7 | 15.6 | 28.3 | 26.7 |
| Chris | 37.3 | 60.2 | 19 | 88 | 2.7 | 15.7 | 25.7 | 20.0 |
| NDSW0481 | 37.3 | 57.9 | 19 | 72 | 2.7 | 15.9 | 24.3 | 26.7 |
| Marquis | 36.8 | 59.1 | 22 | 108 | 2.3 | 16.0 | 26.6 | 16.7 |
| Mean | 45.5 | 60.1 | 18.0 | 73.0 | 0.6 | 15.3 | 27.4 | 19.3 |
| LSD | 8.1 | 1.1 | 1.5 | 8.1 | 1.1 | 0.6 | 2.2 | 9.3 |
| CV | 11:0 | 1.4 | 1.5 | 7.0 | 107.6 | 2.4 | 4.8 | 29.8 |

¹Taken from Table 10 of the 2006 Hard Red Spring Uniform Regional Nursery Report.

Table 5. 2006 Hard Red Spring Wheat Uniform Regional Nurserv¹, Pullman, WA.²

| | | T4 | redorana | | 1 | | Stripe | Rust | |
|--------------------|-------|--------------|--|--------|--|--------------|---------|-------------|-----------|
| Line | Yield | Test Wt. | Heading | Height | Protein | Readii In | ng 1 | Readi In | ng 2 % |
| | Bu/Ac | Lb/Bu | d from 6-1 | cm | % | Type | Inf | Type | Inf |
| BZ901-543W | 86.2 | 59.6 | 23 | 97 | 13.2 | 0 | 0 | 0 | 0 |
| 98S0051-1-14 | 82.0 | 60.8 | 22 | 86 | 14.2 | 4 | 5 | 3 | 20 |
| BW864 | 78.2 | 59.7 | 22 | 91 | 15.1 | 6 | 5 | 5 | 20 |
| NE-108-46 | 78.0 | 57.2 | 24 | 89 | 13.0 | 7 | 2 | 4 | 5 |
| MN03358-4 | 76.7 | 60.2 | 25 | 107 | 14.5 | 6 | 5 | 3 | 5 |
| MT 0416 | 76.3 | 57.4 | 24 | 89 | 14.1 | 8 | 10 | 8 | 25 |
| WA007998 | 74.7 | 56.1 | 22 | 91 | 14.7 | .0 | 0 | 3 | 5 |
| SD3868 | 74.5 | 59.2 | 27 | 112 | 13.7 | 0 | 0 | 0 | 0 |
| BW379 | 72.5 | 60.1 | 19 | 89 | 15.0 | 5 | 5 | 8 | 25 |
| SD3851 | 72.2 | 60.9 | 19 | 102 | 14.9 | 2 | 2 | 4 | 20 |
| SD4001 | 71.8 | 58.4 | 26 | 99 | 15.1 | 4 | 10 | 4 | 20 |
| SD3943 | 71.1 | 58.7 | <u></u> | 102 | 13.8 | 5 | 2 | 5 | 40 |
| 99S0362-21 | 70.6 | 60.0 | 25 | 76 | 14.3 | 8 | 10 | 5 | 40 |
| 98S0113-20-23 | 69.5 | 60.4 | 22 | 86 | 14.0 | 8 | 15 | 8 | 50 |
| CA905-752 | 68.8 | 57.3 | 24 | 81 | 13.7 | 7 | 5 | 7 | 80 |
| MN02255 | 68.7 | 58.3 | 25 | 91 | 13.9 | 6 | 10 | 3 | 20 |
| CA902-704 | 68.5 | 61.7 | 29 | 84 | 15.4 | 2 | 2 | 5 | 30 |
| ND04/3-18 | 68.2 | 60.1 | 21 | 91 | 14.0 | <u> </u> | 5 | 8 | 70 |
| MN02072-7 | 67.1 | 60.1 | 24 | 86 | 15.0 | 7 | 5 | 7 | 40 |
| MN03306-1 | 66.7 | 59.8 | 23 | 99 | 14.1 | 7 | 15 | 5 | 25 |
| BW342 | 66.5 | 60.0 | 24 | 104 | 15.4 | 2 | 2 | 6 | 15 |
| Keene | 66.4 | 58.9 | 27 | 117 | 14.7 | 7 | 5 | 6 | 30 |
| SD3944 | 66.2 | 57.7 | 22 | 102 | 14.0 | 8 | 30 | 5 | 50 |
| CA905-751 | 65.9 | 55.6 | 28 | 79 | 14.0 | 6 | 2 | 5 | 20 |
| 2375 | 64.4 | 57.7 | 25 | 107 | 15.2 | . 8 | 20 | 5 | 60 |
| ND04/3-19 | 63.4 | 55.7 | 27 | 89 | 14.8 | 8 | 5 | 8 | 60 |
| NE-188-24 | 63.0 | 53.7 | 28 | | htsphilippin i de la company de la compa | 8 | 5 5 | <u> </u> | 30 |
| MT 0415 | 62.9 | | 25 25 | 86 | 13.6 | 8 | | ა 8 | |
| 05M SP5 | 62.7 | 57.3 59.9 | 26 | 94 | 15.6 | | 10 | | 25 |
| ND03/1-13 | | | , hoppy and the propriet of th | 89 | 13.4 | 8 7 | 30 | 8 | 90 |
| | 62.7 | 58.1 | 23 | 97 | 14.3 | | 2 | 7 | 70 50 |
| ND04/3-21 PT436 | 62.4 | 59.0 | 20 | 86 | 14.5 | 8 | 10 | 8 | 50 |
| NDSW0430 | 62.3 | 58.2 | 25 | 104 | 15.8 | 4 | 5 | 6 | 25 |
| | 61.6 | 56.8 | 25 25 | 99 | 14.2 | 8 | 15 - | 8 | 70 |
| ND04/3-20 | 59.6 | 56.3 | 25 27 | 99 | 14.5 | 7 | 5 | 8 | 60 |
| NDSW0449 | 59.1 | 58.0 | 27 | 97 | 15.1 | 8 | 10 | 7 | 60 |
| MN02252-A | 58.0 | 56.2 | 27 | 94 | 14.8 | 3 | 2 | 6 | 60 |
| Verde Marania | 55.9 | 53.4 | 26 | 84 | 15.7 | 7 | 10 | 3 | 10 |
| Marquis | 49.0 | 57.6 | 28 | 130 | 15.4 | 3 | 2 | 2 | 5 |
| Chris | 46.6 | 55.5 | 28 | 124 | 16.2 | 3 | 2 | 3 | 15 |
| NDSW0481 | 46.5 | 55.5 | 25 | 94 | 14.6 | 8 | 25 | 8 | 90 |

¹Location planted as a single plot observation nursery.
²Taken from Table 20 of the 2006 Hard Red Spring Wheat Uniform Regional Nursery Report.

Table 6. 2006 Hard Red Spring Wheat Uniform Regional Nursery Stripe Rust Under Natural

Infection at Spillman (Loc 1) and Whitlow (Loc 4) Farms near Pullman, WA1.

| | • | la* -7/5/2006 Loc 1b* - 7/12/2006 wering-milk Flowering | | | Loc 4* -7/17/2006 Soft dough | | |
|---------------|------|---|------|-----|---------------------------------|-----|--|
| Line | IT** | % | IT ' | % | l IT | % | |
| Marquis | 5 | 20 | 5 | 10 | 5 | 20 | |
| Chris | 8 | 20 | 8 | 30 | 8 | 10 | |
| 2375 | 8 | 70 | 8 | 50 | 8 | 30 | |
| Verde | 8 | 30 | 8 | 5 | 2 | 1 | |
| Keene | 8 | 30 | 8 | 10 | 8 | 20 | |
| MN02072-7 | 8 | 50 | 8 | 40 | 8 | 40 | |
| MN02252-A | 8 | 80 | 8 | 50 | 8 | 70 | |
| MN02255 | 8 | 30 | 8 | 10 | 2 | 1 | |
| MN03306-1 | 8 | 40 | 8 | 5 | 2 | 1 | |
| MN03358-4 | 3 | 10 | 2 | 1 | 2 | 1 | |
| SD3851 | 8 | 50 | 8 | 50 | . 8 | 50 | |
| SD3868 | 0,8 | - 5 | 2 | 1 | 2 | 1 | |
| SD3943 | 8 | 80 | 8 | 50 | 8 | 40 | |
| SD3944 | 8 | 70 | 8 | 40 | 8 | 30 | |
| SD4001 | 8 | 20 | 8 | 20 | 8 | 10 | |
| NDSW0430 | 8 | 90 | 8 | 60 | 8 | 90 | |
| NDSW0449 | 8 | 70 | 8 | 40 | 8 | 20 | |
| NDSW0481 | 8 | 95 | 8 | 100 | 8 | 100 | |
| MT 0415 | 8 | 30 | 8 | 30 | 8 | 30 | |
| MT 0416 | 8 | 40 | 8 | 40 | 8 | 50 | |
| WA007998 | 5 | 10 | 2 | 1 | 2 | 1 | |
| NE-108-46 | 3,8 | 10 | 2 | 1 | 2 | 1 | |
| NE-188-24 | 5 | 20 | 2 | 5 | 2 | 1 | |
| ND03/1-13 | 8 | 70 | 8 | 60 | 8 | 60 | |
| ND04/3-18 | 8 | 90 | 8 | 50 | 8 | 70 | |
| ND04/3-19 | 8 | 60 | 8 | 50 | 8 | 60 | |
| ND04/3-20 | 8 | 50 | 8 | 30 | 8 | 50 | |
| ND04/3-21 | 8 | 80 | 8 | 60 | 8 | 80 | |
| PT436 | 3-5 | 20 | 3-5 | 30 | 3 | 10 | |
| BW342 | 8 | 20 | 8 | 40 | 8 | 20 | |
| BW379 | 8 | 40 | 8 | 40 | 8 | 40 | |
| BW864 | 8 | 50 | 8 | 30 | 8 | 20 | |
| CA905-752 | 8 | 70 | 8 | 50 | 8 | 50 | |
| CA905-751 | 5-8 | 40 | 5 | 10 | 5 | 10 | |
| CA902-704 | 8 | 30 | 8 | 30 | 8 | 20 | |
| BZ901-543W | 0 | 0 | 2 | 1 | 2 | 1 | |
| 9980362-21 | 8 | 40 | 8 | 30 | 2 | 5 | |
| 98S0113-20-23 | 8 | 80 | 8 | 40 | 8 | 90 | |
| 98S0051-1-14 | 8 | 30 | 8 | 10 | 2 | 5 | |
| 05M SP5 | 8 | 95 | 8 | 100 | 8 | 90 | |

¹Taken from Table 27 of the 2006 Hard Red Spring Wheat Uniform Regional Nursery Report.

² Plots in LOC 1a were big yield trial plots; Plots in LOC1b were short single rows; Plots in LOC 4 were also short single rows about 4 miles away from LOC 1.

³Infection types (IT) were based on a 0-9 scale, in which 0-3 are generally consider resistant, 4-6 (recorded as 5 in fields) intermediate, and 7-9 susceptible (recorded as 8). IT % = Severity (from X. Chen, USDA-ARS).

Table 7. 2006 Hard Red Spring Wheat Uniform Regional Nursery, Winnipeg, Canada¹

| Table 7. 2006 Ha | rd Red Sp | | t Uniform | Regional | Nursery, | | | | | |
|------------------|-----------|-------|-----------|----------|----------|------|-----|-----|---|---------------------------------|
| | | Test | | | | 1000 | | eaf | _, | 2 |
| Line | Yield | Wt. | Maturity | Height | Protein | KWT | | st* | | m Rust² |
| | Bu/Ac | Lb/Bu | days | cm | % | g | Sev | Inc | Sev | Inc |
| 2375 | 90.3 | 62.5 | 83 | 91 | 11.1 | 39.2 | 5_ | MR | 1 | R |
| SD3868 | 89.3 | 60.8 | 84 | 97 | 11.8 | 36.1 | 5 | MR | 5 | RMR |
| MN03358-4 | 88.8 | 62.4 | 84 | 88 | 11.6 | 34.0 | 0 | R | 3 | R |
| ND04/3-19 | 86.9 | 61.8 | 85 | 87 | 10.7 | 38.9 | 0 | R | 5 | R |
| Verde | 86.3 | 61.6 | 88 | 82 | 13.3 | 36.2 | 0 | R | 7 | |
| BW864 | 85.0 | 63.6 | 86 | 90 | 13.1 | 40.2 | 20 | MR | 2 | R |
| ND04/3-20 | 84.8 | 62.2 | 85 | 97 | 11.1 | 37.3 | 0 | R | 1 | R |
| SD3943 | 84.6 | 62.2 | 83 | 93 | 11.1 | 31.6 | 0 | R | 2 | R |
| SD4001 | 84.4 | 63.1 | 87 | 95 | 11.7 | 33.5 | 0 | R | 12 | |
| MT 0416 | 83.1 | 62.4 | 86 | 85 | 12.3 | 34.3 | 5 | MR | 3 | RMR |
| WA007998 | 82.8 | 61.4 | 85 | 85 | 12.9 | 43.2 | 10 | MR | 20 | MS |
| SD3944 | 82.5 | 61.2 | 82 | 94 | 11.2 | 32.8 | 0 | R | 2 | R |
| ND03/1-13 | 82.3 | 63.1 | 85 | 91 | 12.5 | 38.3 | 0 | R | 1 | R |
| NE-108-46 | 81.8 | 61.5 | 90 | 81 | 11.1 | 39.9 | 0 | R | 2 | R |
| NDSW0430 | 81.3 | 63.6 | 86 | 87 | 12.0 | 36.5 | 0 | R | 2 | R |
| MN02255 | 81.1 | 62.2 | 83 | 86 | 11.9 | 33.6 | 0 | R | 1 | R |
| SD3851 | 80.7 | 63.9 | 85 | 93 | 11.9 | 35.9 | 3 | R | 2 | R |
| PT436 | 80.1 | 62.5 | 84 | 100 | 12.5 | 34.5 | 45 | М | 1 | R |
| MN02252-A | 80.0 | 62.4 | 85 | 88 | 12.3 | 35.0 | 5 | MR | 1 | R |
| ND04/3-21 | 79.0 | 63.9 | 85 | 91 | 13.3 | 36.5 | 0 | R | 1 | R |
| 98S0051-1-14 | 78.9 | 63.2 | 86 | 82 | 12.2 | 37.9 | 15 | MR | 3 | R |
| MT 0415 | 78.4 | 62.5 | 84 | 89 | 12.2 | 38.3 | 30 | М | 3 | R |
| Keene | 78.3 | 62.9 | 87 | 106 | 12.2 | 33.0 | 45 | М | 1 | R |
| MN02072-7 | 77.4 | 63.8 | 83 | 77 | 12.2 | 35.2 | 15 | MR | 10 | MR |
| CA905-751 | 76.7 | 61.9 | 89 | 75 | 12.1 | 39.4 | 0 | R | 15 | MR-S³ |
| Mckenzie | 76.5 | 61.8 | 83 | 101 | 11.9 | 32.8 | 0 | R | 2 | R |
| CA905-752 | 76.4 | 62.2 | 85 | 75 | 12.8 | 35.0 | 15 | MR | 1 | R |
| NDSW0481 | 76.1 | 62.4 | 85 | 91 | 12.6 | 35.6 | 0 | R | 5 | RMR |
| NDSW0449 | 75.9 | 62.6 | 86 | 89 | 12.1 | 32.7 | 35 | М | 10 | RMR |
| ND04/3-18 | 75.7 | 63.9 | 83 | 88 | 12.3 | 35.6 | 0 | R | 2 | R |
| Chris | 74.2 | 62.0 | 87 | 112 | 12.6 | 32.9 | 15 | М | 5 | RMR |
| 05M SP5 | 73.9 | 64.2 | 85 | 84 | 12.4 | 36.1 | 5 | MR | 20 | |
| MN03306-1 | 73.5 | 62.5 | 83 | 88 | 11.7 | 29.4 | 0 | R | 1 | R |
| BW342 | 73.4 | 63.1 | 84 | 95 | 13.0 | 34.6 | 0 | R | 1 | R |
| Marquis | 73.1 | 62.3 | 86 | 112 | 11.9 | 34.4 | 35 | М | 25 | |
| 99\$0362-21 | 72.8 | 62.6 | 86 | 75 | 12.7 | 38.5 | 0 | R | 1 | R |
| NE-188-24 | 71.6 | 61.0 | 91 | 79 | 11.1 | 36.6 | 0 | R | 1 | R |
| 98S0113-20-23 | 70.9 | 61.6 | 85 | 73 | 13.4 | 33.4 | 0 | R | <u>-</u> | R |
| BW379 | 70.6 | 62.8 | 86 | 90 | 14.2 | 36.4 | 35 | M | 2 | R |
| CA902-704 | 67.2 | 64.0 | 88 | 78 | 13.7 | 33.6 | 15 | M | 15 | RMR |
| Mean | 79.2 | 62.5 | 85.3 | 89.0 | 12.2 | 35.7 | ., | 141 | | 1711117 |
| LSD | 8.8 | 0.6 | 2.4 | 5.1 | 1.3 | 1.3 | | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | |
| CV | 6.8 | 0.5 | 1.7 | 3.5 | 6.5 | 2.2 | | | | miniminin/niniminiiniiniiniinii |

Taken from Table 22 of the 2006 Hard Red Spring Wheat Uniform Regional Nursery Report.

Leaf and stem rust reactions determined by Dr. B. McCallum and Dr. T. Fetch respectively, at Glenlea, MB.

³Pustule types ranging from MR to S were observed.

| Table 8. 2006 Hard Red Spring Wheat Uniform Regional Nursery Scab Report, Crookston, MN ¹ . |
|--|
|--|

| Table C. 2000 Hall | | i | | i izegioliai i | uisery Sca | | Crookston, I | |
|--|------------------------|-------------------|------------|----------------|------------|---------|---------------------|--|
| 4. | Heading | VSK | ŧ | Incidence | Severity | Disease | 30 SSW ² | TWT ² |
| Line | d from 6-1 | % | ppm | % | <u>%</u> | Index | g | g |
| Marquis | 37.0 | 20.0 | 4.3 | 75.0 | 20.4 | 15.2 | 17.8 | 11.0 |
| Chris | 38.5 | 27.5 | 5.7 | 82.5 | 36.2 | 29.7 | 15.0 | 10.6 |
| 2375 | 34.0 | 20.0 | 7.4 | 87.5 | 26.5 | 23.1 | 19.7 | 10.8 |
| Verde | 37.0 | 25.0 | 7.5 | 100.0 | 45.7 | 45.7 | 12.6 | 10.2 |
| Keene | 35.0 | 13.5 | 8.2 | 97.5 | 42.2 | 41.2 | 17.3 | 10.5 |
| MN02072-7 | 32.0 | 26.0 | 10.3 | 100.0 | 49.6 | 49.6 | 12.0 | 10.3 |
| MN02252-A | 36.5 | 20.0 | 7.5 | 97.5 | 27.5 | 26.9 | 17.7 | 10.6 |
| MN02255 | 33.5 | 22.5 | 8.1 | 97.5 | 36.5 | 35.8 | 17.5 | 10.6 |
| MN03306-1 | 31.0 | 17.5 | 7.2 | 90.0 | 10.5 | 9.7 | 16.2 | 11.2 |
| MN03358-4 | 36.5 | 11.5 | 5.6 | 72.5 | 9.6 | 6.9 | 23.0 | 11.4 |
| SD3851 | 30.5 | 5.0 | 2.4 | 67.5 | 12.0 | 8.0 | 18.2 | 11.3 |
| SD3868 | 36.0 | 10.5 | 4.4 | 82.5 | 15.8 | 13.4 | 31.7 | 11.1 |
| SD3943 | 30.0 | 7.0 | 3.5 | 75.0 | 11.8 | 8.2 | 18.2 | 10.8 |
| SD3944 | 30.0 | 7.0 | 2.4 | 85.0 | 26.3 | 22.4 | 17.7 | 11.1 |
| SD4001 | 32.5 | 14.0 | 4.4 | 60.0 | 10.5 | 6.3 | 20.4 | 11.1 |
| NDSW0430 | 35.0 | 12.0 | 5.4 | 90.0 | 15.4 | 13.6 | 23.5 | 11.2 |
| NDSW0449 | 36.0 | 15.0 | 5.1 | 72.5 | 14.2 | 10.5 | 18.6 | 10.6 |
| NDSW0481 | 35.0 | 21.0 | 9.0 | 92.5 | 32.7 | 30.2 | 18.6 | 10.7 |
| MT 0415 | 31.5 | 37.5 | 10.5 | 100.0 | 55.1 | 55.1 | 15.8 | 9.9 |
| MT 0416 | 32.5 | 27.5 | 7.6 | 100.0 | 64.9 | 64.9 | 7.9 | |
| WA007998 | 32.0 | 37.5 | 12.2 | 100.0 | 52.4 | 52.4 | 12.9 | 10.1 |
| NE-108-46 | 36.5 | 57.5 | 11.6 | 95.0 | 42.8 | 40.3 | 15.4 | 9.8 |
| NE-188-24 | 38.0 | 25.0 | 12.7 | 100.0 | 54.0 | 54.0 | 9.6 | 9.5 |
| ND03/1-13 | 31.5 | 13.5 | 4.5 | 97.5 | 20.5 | 20.1 | 16.3 | 10.8 |
| ND04/3-18 | 32.0 | 9.0 | 5.2 | 97.5 | 17.0 | 16.7 | 17.2 | 11.6 |
| ND04/3-19 | 37.5 | 12.0 | 6.1 | 80.0 | 19.8 | 16.1 | 21.9 | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |
| ND04/3-20 | 35.5 | 15.0 | 7.7 | 97.5 | 28.1 | 27.5 | | 11.2 |
| ND04/3-21 | 32.0 | 11.0 | 6.9 | 92.5 | 15.7 | | 15.1 | 10.2 |
| PT436 | 31.0 | 15.0 | 3.1 | 70.0 | | 14.9 | 18.9 | 11.4 |
| BW342 | 30.5 | 13.5 | 5.2 | | 30.2 | 20.9 | 16.3 | 10.4 |
| BW379 | 30.5 | 7.0 | | 75.0 | 19.7 | 17.0 | 17.2 | 11.0 |
| BW864 | 31.0 | ~~~~~~~~ <u>~</u> | 5.0 | 95.0 | 13.5 | 12.9 | 21.4 | 11.8 |
| CA905-752 | - | 17.0 | 10.3 | 97.5 | 17.9 | 17.5 | 15.7 | 10.7 |
| CA905-752 CA905-751 | 33.0 | 37.5 | 19.6 | 100.0 | 74.4 | 74.4 | 14.5 | 10.2 |
| and the state of t | 36.0 | 30.0 | 21.5 | 97.5 | 56.0 | 54.6 | 19.1 | 10.1 |
| CA902-704 | 38.5 | 9.0 | 5.4 | 85.0 | 22.4 | 19.1 | 19.0 | 12.2 |
| BZ901-543W | 32.0 | 22.5 | 11.2 | 100.0 | 57.0 | 57.0 | 18.1 | 10.4 |
| 99S0362-21 | 33.0 | 32.5 | 11.6 | 97.5 | 33.8 | 32.9 | 17.6 | 10.6 |
| 98S0113-20-23 | 30.0 | 30.0 | 10.0 | 97.5 | 46.3 | 45.6 | 14.5 | 10.1 |
| 98S0051-1-14 | 33.0 | 35.0 | 12.3 | 100.0 | 46.4 | 46.4 | 14.6 | 10.2 |
| 05M SP5 | 37.0 | 7.0 | 6.0 | 55.0 | 12.0 | 6.7 | 21.7 | 11.4 |
| Alsen (MR ck) | 32.5 | 10.0 | 6.8 | 92.5 | 24.5 | 22.4 | 16.0 | 11.6 |
| BacUp (MR ck) | 30.0 | 9.0 | 4.4 | 67.5 | 10.3 | 7.5 | 15.1 | 11.3 |
| Roblin (sus ck) | 30.0 | 65.0 | 7.1 | 100.0 | 77.8 | 77.8 | 14.8 | 9.9 |
| Wheaton (sus ck) | 36.5 | 67.5 | 16.7 | 100.0 | 79.8 | 79.8 | 11.3 | 9.0 |
| MN00269 (sus ck) | 39.0 | 42.5 | 16.9 | 100.0 | 79.3 | 79.3 | 6.6 | _ |
| Mean | 33.7 | 22.1 | 8.1 | 89.2 | 33.6 | 31.8 | 16.9 | 10.7 |
| LSD | 2.0 | 10.8 | | 19.4 | 18.0 | 17.6 | 4.5 | 0.8 |
| CV | 2.9 f the 2006 Hard | 24.3 | - transmit | 10.6 | 24.5 | 27.4 | 26.4 | 3.8 |

Taken from Table 28 of the 2006 Hard Red Spring Wheat Uniform Regional Nursery Report.

230 SSW = 30 spike seed weight; TWT=micro test weight. This is the sample used to determine VSK.

Exhibit B. Statement of Distinctness

Vantage is most similar to the hard red spring wheat variety Granite. However, Vantage can be distinguished from Granite by three distinct morphological characteristics, glume color, head morphology, and glume morphology.

- 1. Vantage has tan glumes at maturity while Granite has white glumes.
- 2. Vantage has a strap shaped head while Granite has a tapering shaped head.
- 3. Vantage has glumes with square shoulders while Granite has glumes with wanting shoulders.

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U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY PLANT VARIETY PROTECTION OFFICE BELTSVILLE, MD 20705

Exhibit C

OBJECTIVE DESCRIPTION OF VARIETY Wheat (Triticum enn)

| | triidat (iiitidam opp.) | |
|--|--|---|
| NAME OF APPLICANT (S) | TEMPORARY OR EXPERIMENTAL DESIGNATION | VARIETY NAME |
| WestBred LLC | CA902-704 | Vantage |
| | | |
| ADDRESS (Street and No. or RD No., City, State, Zip Code and Cod | intry) | FOR OFFICIAL USE ONLY |
| 81 Timberline Drive | | PVPO NUMBER |
| | | |
| Bozeman, MT 59718-8184 | | l #20080012/ |
| | 107-147-1 | |
| PLEASE READ ALL INSTRUCTIONS CAREFULLY: | | |
| Place the appropriate number that describes the varie | tal character of this variety in the boxes below. Place a | zero in the first box (e.g., 0 9 9 or 0 9) |
| | rely. Data for quantitative plant characters should be ba | ` <u> </u> |
| - | ne trial. Royal Horticultural Society or any recognized of | · |
| | Please answer all questions for yo | |
| your application. | . I lease allower all questions for ye | valiety, tack of response may delay progress of |
| your application. | | - |
| 1. KIND: | 2. VERNALIZATION: | |
| ГП | | |
| 1 = Common 2 = Durum | 1 = Spring 2 = Winter | |
| 3 = Club | | pecify) |
| 4 = Other (Specify) | | , |
| | · · · · · · · · · · · · · · · · · · · | |
| 3. COLEOPTILE ANTHOCYANIN: | 4. JUVENILE PLANT GR | OWTH: |
| 1 1 = Absent 2 = Present | 2 1 = Prostra | te 2 = Semi-Erect 3 = Erect |
| Z-11esent | I - Flostia | ne 2 – Semi-Elect 3 – Elect |
| 5. PLANT COLOR: (boot stage) | 6. FLAG LEAF: (boot star | 20) |
| | 6. FLAG LEAF. (DOUT STA | ge) |
| 2 1 = Yellow-Green | 1 = Erect | 2 = Recurved |
| اــــا 2 = Green 3 = Blue-Green | 2 1 = Not Twist | ted 2 = Twisted |
| | | |
| | 2 1 = Wax Abs | ent 2 = Wax Present |
| | *************************************** | ************************************** |
| 7. EAR EMERGENCE: | | |
| 0 3 1 Number of Days (Average) | | |
| Number of Days Earlier Than * | | |
| - | Granite | |
| | | |
| Number of Days Later Than * | lative to a PVPO-Approved Commercial Variety Grown | in the Same Trial |
| | - Approved Commercial Vallety Grown | mano camo mar |
| e ANTUED COLOD: | | |
| 8. ANTHER COLOR: | | · |
| 1 = Yellow 2 = Purple | | |
| | | |

| 9. PLANT HEIGHT: (from soil to top of head, excluding awns) 0 7 8 cm (Average) | |
|---|---|
| cm Taller Than | * |
| Same As Granite | * |
| cm Shorter Than | |
| 10. STEM: | |
| A. ANTHOCYANIN | D. INTERNODE |
| 1 = Absent 2 = Present | 1 1 = Hollow 2 = Semi-Solid 3 = Solid Number of Nodes |
| B. WAXY BLOOM | E. PEDUNCLE |
| 2 1 = Absent 2 = Present | 1 1 = Erect 2 = Recurved 3 = Semi-Erect 3 2 cm Length |
| C. HAIRINESS (last internode of rachis) | F. AURICLE |
| 2 1 = Absent 2 = Present | 1 Anthocyanin: 1 = Absent 2 = Present |
| | Hair: 1 = Absent 2 = Present |
| 11. HEAD: (At Maturity) | |
| A. DENSITY | C. CURVATURE |
| 1 = Lax 2 = Middense (Laxidense) 3 = Dense | 1 = Erect 2 = Inclined 3 = Recurved |
| B. SHAPE | D. AWNEDNESS |
| 2 1 = Tapering 2 = Strap 3 = Clavate 4 = Other (Specify) | 1 = Awnless 2 = Apically Awnletted 3 = Awnletted 4 = Awned |
| 12. GLUMES: (At Maturity) | |
| A. COLOR | E. BEAK WIDTH |
| 1 = White 2 = Tan 3 = Other (Specify) | 2 1 = Narrow 2 = Medium 3 = Wide |
| B. SHOULDER | F. GLUME LENGTH |
| 1 = Wanting 2 = Oblique 3 = Rounded 4 = Square 5 = Elevated 6 = Apiculate 7 = Other (Specify) | 1 = Short (ca. 7 mm) 2 = Medium (ca. 8 mm) 3 = Long (ca. 9 mm) |
| C. SHOULDER WIDTH | G. WIDTH |
| 1 = Narrow 2 = Medium 3 = Wide | 3 1 = Narrow (ca. 3 mm) 2 = Medium (ca. 3.5 mm) 3 = Wide (ca. 4 mm) |
| D. BEAK | H. PUBESCENCE |
| 1 = Obtuse 2 = Acute 3 = Acuminate | 1 = Not Present 2 = Present |

| 13. SI | EED. | | |
|-------------|--|---|------------------------------|
| | . SHAPE | E. COLOR | |
| | 1 = Ovate | | |
| 1 | 2 = Oval 3 = Elliptical | 1 = vynite 2 = Amber 3 = Red | |
| | | 4 = Other (Specify) | |
| В | . CHEEK | F. TEXTURE | |
| 1 | 1 = Rounded 2 = Angular | 1 = Hard 2 = Soft | |
| | _ / | 3 = Other (Specify) | |
| С | . BRUSH | G. PHENOL REACTION (See Instructions | s) |
| 2 | 1 = Short | 2 1 = Ivory 4 = Dark Bro 2 = Fawn 5 = Black | own |
| | 3 = Long | 3 = Light Brown | |
| D | CREASE | H. SEED WEIGHT | |
| 2 | 1 = Width 60% or less of Kernel 2 = Width 80% or less of Kernel | 3 3 g/1000 Seed (whole numbe | r only) |
| | 3 = Width Nearly as Wide as Kernel | I. GERM SIZE | |
| 2 | 1 = Depth 20% or less of Kernel 2 = Depth 35% or less of Kernel | | |
| لــــا | 3 = Depth 50% or less of Kernel | 2 = Midsize | |
| | | 3 = Large | |
| 14. DIS | SEASE: PLEASE INDICATE THE SPECIFIC RACE OR S | STRAIN TESTED | |
| | (0 = Not Tested 1 = Susceptibl | le 2 = Resistant 3 = Intermediate 4 = Tole | rant) |
| 2 | Stem Rust (Puccinia graminis f. sp. tritici) | 3 Leaf Rust (Puccinia recondita f. sp. tritici) | |
| 1 | Stripe Rust (<i>Puccinia striiformis</i>) | 0 Loose Smut (Ustilago tritici) | |
| 3 | Tan Spot (<i>Pyrenophora tritici-repentis</i>) | O Flag Smut (Urocystis agropyri) | |
| 0 | Halo Spot (Selenophoma donacis) | Common Bunt (Tilletia tritici or T. laevis) | |
| 0 | Septoria nodorum (Glume Blotch) | Dwarf Bunt (Tilletia controversa) | |
| 0 | Septoria avenae (Speckled Leaf Disease) | O Karnal Bunt (<i>Tilletia indica</i>) | |
| 3 | Septoria tritici (Speckled Leaf Blotch) | O Powdery Mildew (Erysiphe graminis f. sp. tr | ritici) |
| 3 | Scab (<i>Fusarium</i> spp.) | O "Snow Molds" | |
| 0 | "Black Point" (Kernel Smudge) | O Common Root Rot (Fusarium, Cochliobolus | s and <i>Bipolaris</i> spp.) |
| 0 | Barley Yellow Dwarf Virus (BYDV) | 0 Rhizoctonia Root Rot (Rhizoctonia solani) | |
| 0 | Soilborne Mosaic Virus (SBMV) | Black Chaff (Xanthomonas campestris pv. t | translucens). |
| 0 | Wheat Yellow (Spindle Streak) Mosaic Virus | Bacterial Leaf Blight (Pseudomonas syrings) | ae pv. syringae) |
| 0 | Wheat Streak Mosaic Virus (WSMV) | Other (Specify) | |
| | Other (Specify) | Other (Specify) | |
| | Other (Specify) | Other (Specify) | |
| | Other (Specify) | Other (Specify) | |
| | | | |
| 5. INS | ECT: (0 = Not Tested 1 = Susceptible 2 = Resis | stant 3 = Intermediate 4 = Tolerant) | |
| | | SPECIFY BIOTYPE (where needed) | |
| | Hessian Fly (Mayetiola destructor) | Other (Specify) | <u> </u> |
| | Stem Sawfly (Cephus spp.) | Other (Specify) | * UNIX |
| 0 | Cereal Leaf Beetle (Oulema melanopa) | Other (Specify) | _ |

#200800127

Exhibit C (Wheat)

| 15. INSECT: (continued) | (0 = Not Tested | 1 = Susceptible | 2 = Resistant | 3 = Intermediate | 4 = Tolerant) | |
|-------------------------|-----------------|-----------------|----------------|------------------|---------------|-------------|
| | | PLEASE S | PECIFY BIOTYPE | (Where Needed) | | |
| 0 Russian Aphid (Di | iuraphis noxia) | | Other (\$ | Specify) | | |
| O Greenbug (Schiza | phis graminum) | i | Other (5 | Specify) | | |
| O Aphids | | | Other (5 | Specify) | · | |
| • | | ~~~ | | | | ****** |

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS:

| REPRODUCE LOCALLY. Include form number and edition date on al | reproductions. F | ORM APPROVED - OMB No. 0581-0055 |
|--|---|---|
| U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE EXHIBIT E STATEMENT OF THE BASIS OF OWNERSHIP | Application is required in order to detect certificate is to be issued (7 U.S.C. 24 confidential until the certificate is issued. | 121). The information is held |
| 1. NAME OF APPLICANT(S) | 2. TEMPORARY DESIGNATION | 3. VARIETY NAME |
| `, | OR EXPERIMENTAL NUMBER | |
| WestBred LLC | CA902-704 | Vantage |
| 4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) | 5. TELEPHONE (Include area code) | 6. FAX (Include area code) |
| 81 Timberline Dr. | (406) 587-1218 | (406) 586-8247 |
| Bozeman, MT 59718-8184 | 7. PVPO NUMBER | 200800127 |
| 8. Does the applicant own all rights to the variety? Mark an "X" in the | e appropriate block. If no, please expla | in. YES NO |
| 9. Is the applicant (individual or company) a U.S. national or a U.S. b | pased company? If no, give name of co | ountry. YES NO |
| 10. Is the applicant the original owner? YES | NO If no, please answer <u>one</u> | of the following: |
| a. If the original rights to variety were owned by individual(s), is (YES b. If the original rights to variety were owned by a company(ies) YES | NO If no, give name of count | ry sed company? |
| 11. Additional explanation on ownership (Trace ownership from origin | nal breeder to current owner. Use the re | everse for extra space if needed): |
| PLEASE NOTE: | | |
| | | |
| Plant variety protection can only be afforded to the owners (not licens | , s | of a LIDOV assessment as |
| If the rights to the variety are owned by the original breeder, that penational of a country which affords similar protection to nationals of | erson must be a U.S. national, national of the U.S. for the same genus and speci- | or a upov member country, or es. |
| If the rights to the variety are owned by the company which employ nationals of a UPOV member country, or owned by nationals of a genus and species. | | |
| 3. If the applicant is an owner who is not the original owner, both the | original owner and the applicant must m | eet one of the above criteria. |
| The original breeder/owner may be the individual or company who dir Act for definitions. | rected the final breeding. See Section 4 | 1(a)(2) of the Plant Variety Protection |
| According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, control number. The valid OMB control number for this information collection is 0581-0055, including the time for reviewing the instructions, searching existing data sources, gathering a | The time required to complete this information collect | tion is estimated to average 0.1 hour per response, |

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, D.C. 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provide and employer.

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U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY PLANT VARIETY PROTECTION OFFICE BELTSVILLE. MD 20705

EXHIBIT F
DECLARATION REGARDING DEPOSIT

| ADDRESS (Street and No. or RD No., City, State, and Zip Code and Country) | TEMPORARY OR EXPERIMENTAL DESIGNATION | | | | |
|---|---|--|--|--|--|
| 1725 1st Avenue North, Unit H | CA902-704 | | | | |
| Fargo, ND 58102 | VARIETY NAME Vantage | | | | |
| ADDRESS (Street and No. or RD No., City, State, and Zip Code and Country) | FOR OFFICIAL USE ONLY | | | | |
| 1725 1st Avenue North, Unit H Fargo, ND 58102 | PVPO NUMBER 0 0 0 0 0 1 2 | | | | |
| | 1725 1st Avenue North, Unit H Fargo, ND 58102 ADDRESS (Street and No. or RD No., City, State, and Zip Code and Country) 1725 1st Avenue North, Unit H | | | | |

I do hereby declare that during the life of the certificate a viable sample of propagating material of the subject variety will be deposited, and replenished as needed periodically, in a public repository in the United States in accordance with the regulations established by the Plant Variety Protection Office.

Signature Tomas

February 1, 2008

Date